

1 / 28

CTCGAGGACAGTGACCTGGGAGTGAGTACAAGGTGAGGCCACCACTCAGGGT
 GCCAGCTCCAAGCGGGTCACAGGGACGAGGGCTGCGGCCATCAGGAGGCCCT
 GCACACACATCTGGGACACGCGCCCCCGAGGGCCAGTTCACCTCAGTGCGCC
 TCATTCTCCTGCACAAAAGCGCCCCCATCCTTTCTTCACAAGGCTTTTCGTGG
 AAGCAGAGGCGTCGATGCCCAGTACCCTCTCCCTTTCCCAGGCAACGGGACC
 CCAAGTTTGCTGACTGGGACCACCAAGCCACGCATGCGTCAAGAGTGAGAGT
 CCGGGACCTAGGCAGGGGCCCCTGGGGTTGGGCCTGAGAGAGAAGAGAACCTC
 CCCCAGCACTCGGTGTGCATCGGTAGTGAAGGAGCCTCACCTGACCCCCGCT
 GTTGCTCAATCGACTTCCCAAGAACAGAGAGAAAAGGGAACTTCCAGGGCGG
 CCCGGGCCTCCTGGGGGTTCCCACCCCATTTTTAGCTGAAAGCACTGAGGCA
 GAGCTCCCCCTACCCAGGCTCCACTGCCCGGCACAGAAATAACAACCACGGT
 TACTGATCATCTGGGAGCTGTCCAGGAATTC

FIG._1A

1 GCTGGGCTAA ACTGGGCTAG CCTGAGCTGG GCTGAACTGG GCTGCTGGGC
 51 TGGACTGGGT AAGCTGGGCT GAGCTGGGTT GGGTGGAAAT GGGCTGAGCT
 101 GAGCTAGGCT AAAGTGGGTT TGGCTGGGCT GGGCTGGGCT GGG

FIG._2B

1 GGTTTGGCTG GGCTGGGCTG GGCTGGGCTG GGTTTCACTG AGCGGGTTGG
 51 GTTAGACTGG GTCAAAGTGG TTCAGC

FIG._2C

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GERMLINE & LOCUS

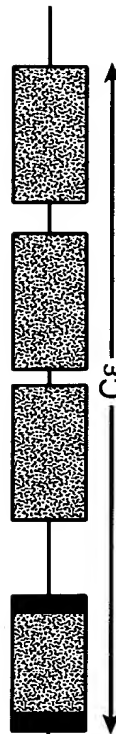
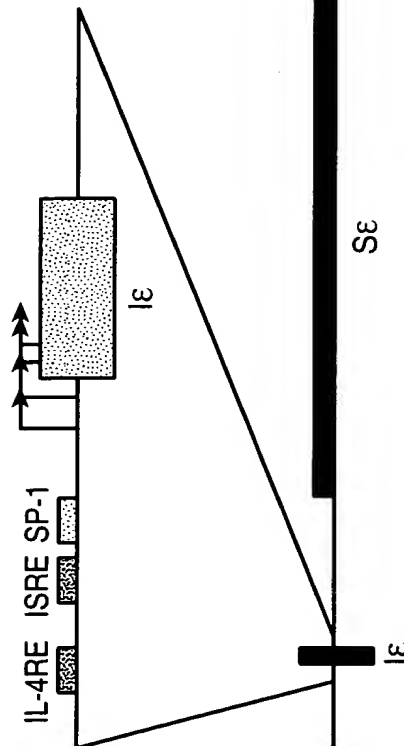
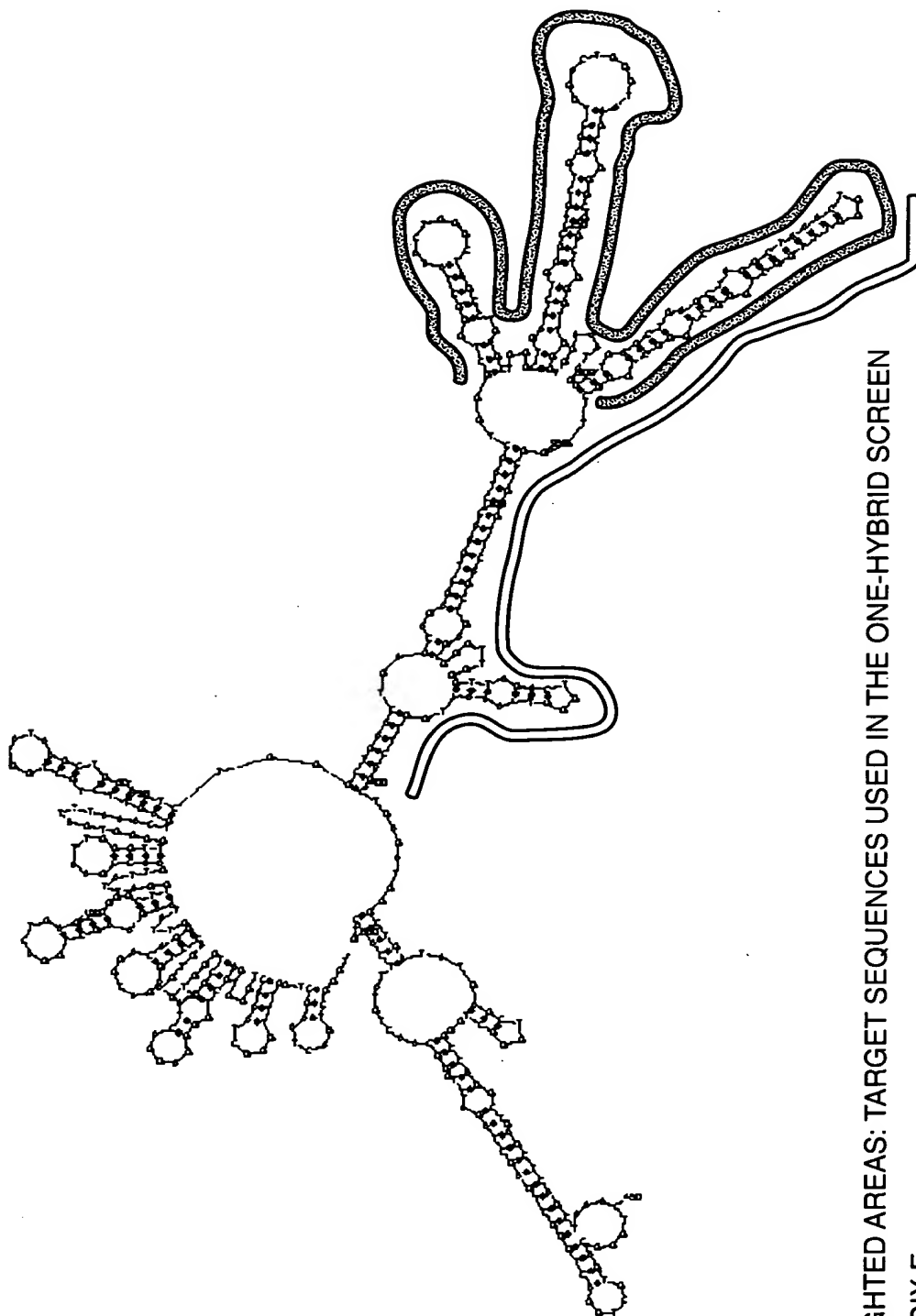


FIG. 1B

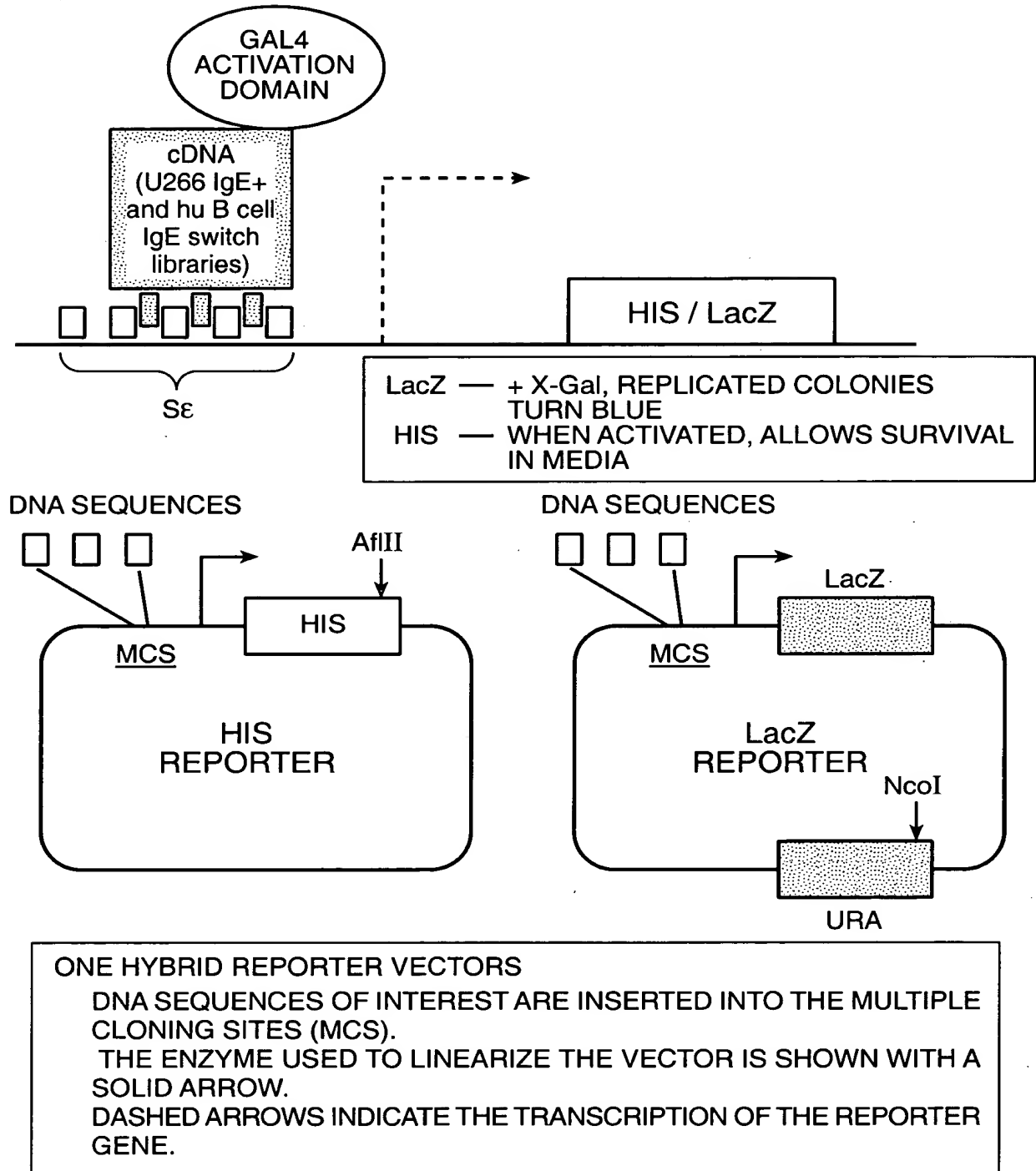
LOW ENERGY DNA FOLDING OF THE S_ε REGION



HIGHLIGHTED AREAS: TARGET SEQUENCES USED IN THE ONE-HYBRID SCREEN
APPENDIX E

FIG._2A

YEAST ONE-HYBRID SCREENING



APPENDIX F

FIG._3

5 / 28

IL-4 INDUCTION OF GERMLINE ϵ mRNA IN THE
IgM + B CELL LINES: CA-46, MC-116 AND DND39

DND39 + IL-4

DND39 - IL-4

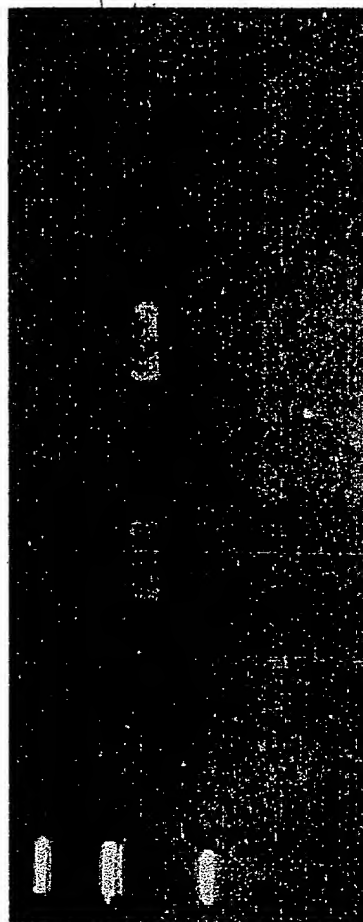
MC-116 + IL-4

MC-116 - IL-4

CA-46 + IL-4

CA-46 - IL-4

NEG. CONT.



246bp

123bp

CELLS WERE INCUBATED FOR 48 HRS. IN 300 U / ml OF h-IL-4.
RT-PCR WAS PERFORMED USING PRIMERS SPECIFIC FOR THE GERMLINE
 ϵ EXON AND THE 5'-END OF THE C ϵ CH1 EXON (PREDICTED SIZE ~ 200 bp).

APPENDIX G

FIG. 4

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APPROACHES TO GENERATE GERMLINE ϵ PROMOTER KNOCK-IN REPORTER CELL LINES

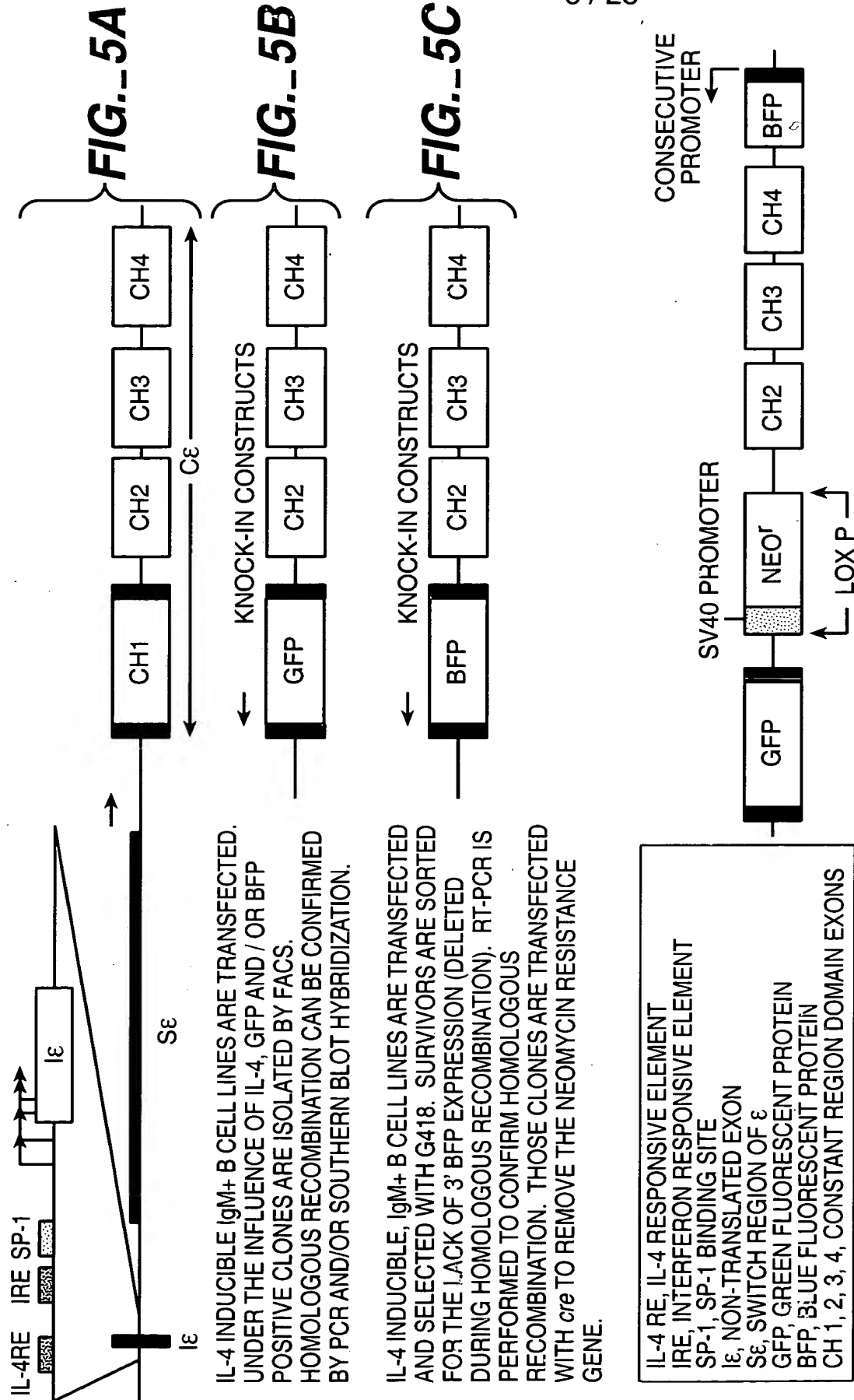
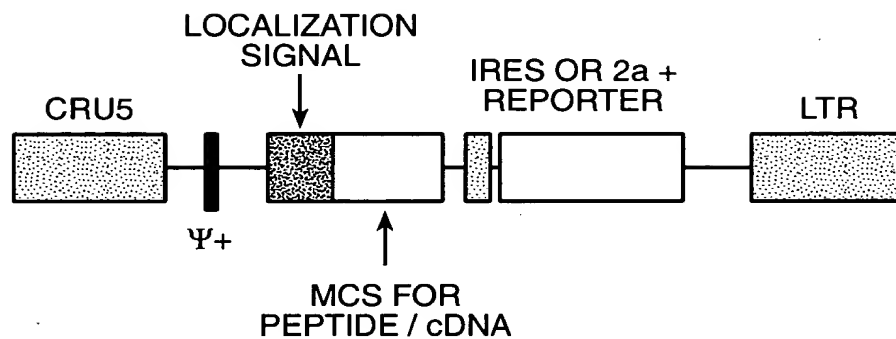


FIG. 5D

APPENDIX A

RIGEL BASE VECTOR



ALL COMPONENTS ARE UNIQUELY CASSETTED FOR FLEXIBILITY

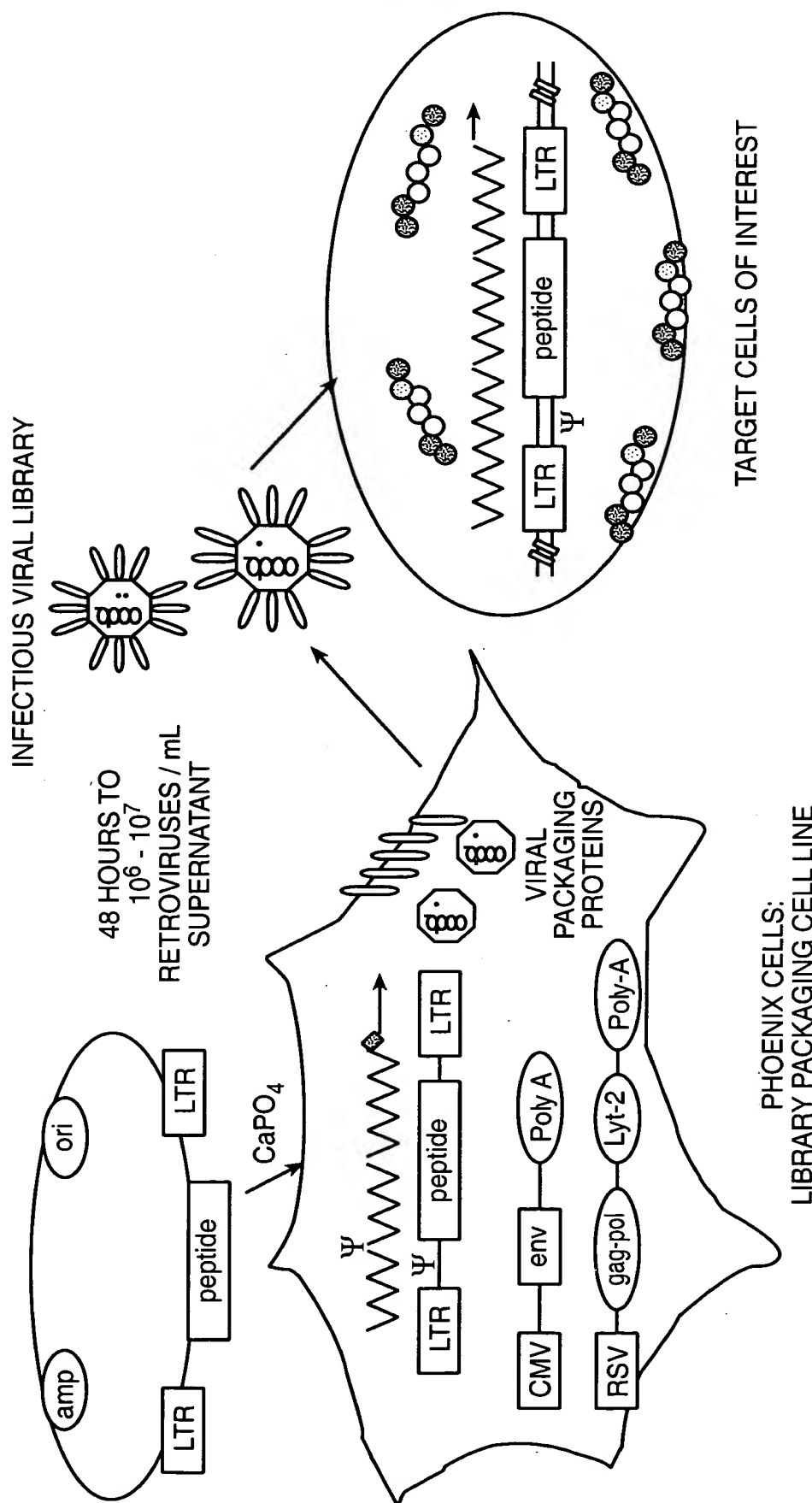
CRU5, MODIFIED LTR
 LTR, LONG TERMINAL REPEAT
 $\Psi+$, PACKING SIGNAL
 LOCALIZATION SIGNAL: NUCLEAR, CELL MEMBRANE, GRANULAR
 MCS, MULTIPLE CLONING SITE
 IRES, INTERNAL RIBOSOME ENTRY SITE
 2a, SELF-CLEAVING PEPTIDE

APPENDIX I

FIG._6

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PROTOCOL FOR TRANSFECTION OF PHOENIX CELLS AND INFECTION OF NONADHERENT TARGET CELLS



APPENDIX I

FIG. 7

9 / 28

ε HEAVY CHAIN GFP / BFP KNOCK-IN CELL LINE

U266 ε HEAVY CHAIN

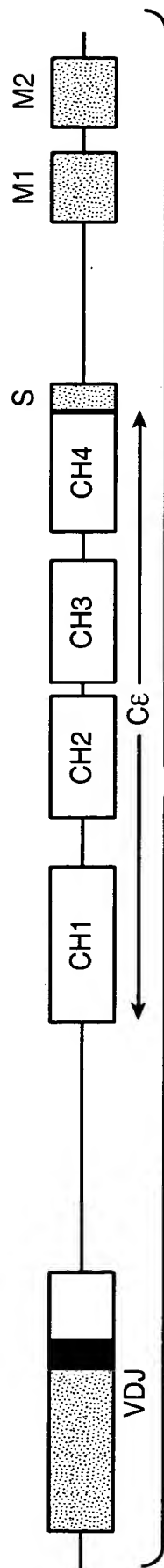
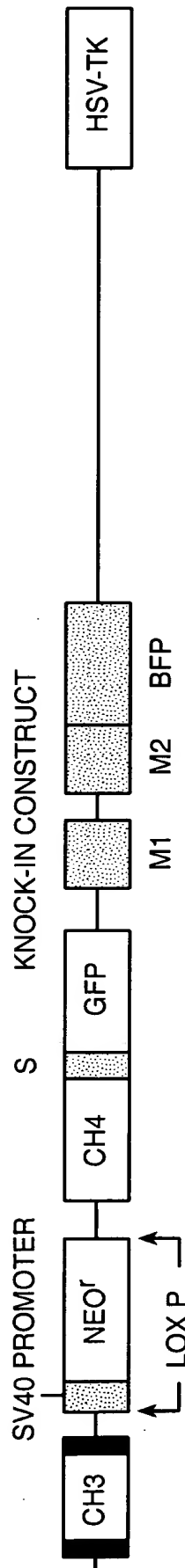


FIG..8A



S, SECRETORY EXON
GFP, GREEN FLUORESCENT PROTEIN
BFP, BLUE FLUORESCENT PROTEIN
Neo^r, NEOMYCIN RESISTANCE GENE
VDJ, V REGION EXON
CH 1, 2, 3, 4, CONSTANT REGION DOMAIN EXONS
M1, M2, MEMBRANE EXONS
HSV-TK, HERPES SIMPLEX VIRUS-THYMIDINE KINASE

U266 CELLS ARE TRANSFECTED AND SELECTED WITH G418. SURVIVORS ARE TREATED WITH GANCICLOVIR (HSV-TK DELETED DURING HOMOLOGOUS RECOMBINATION). RT-PCR IS PERFORMED TO CONFIRM HOMOLOGOUS RECOMBINATION. THOSE CLONES ARE TRANSFECTED WITH *cre* TO REMOVE THE SV40 NEOMYCIN RESISTANCE GENE.

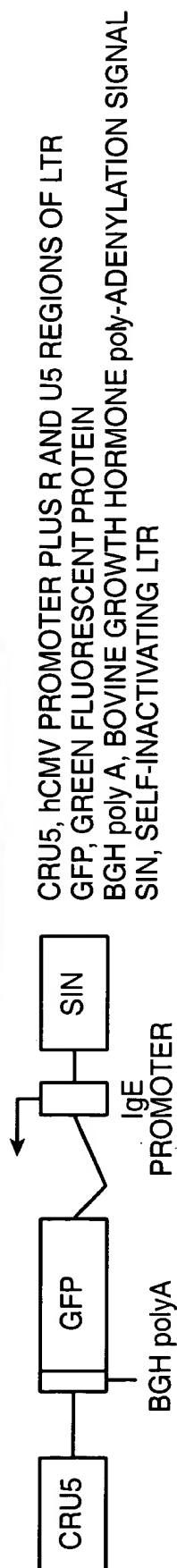
APPENDIX D

FIG..8B

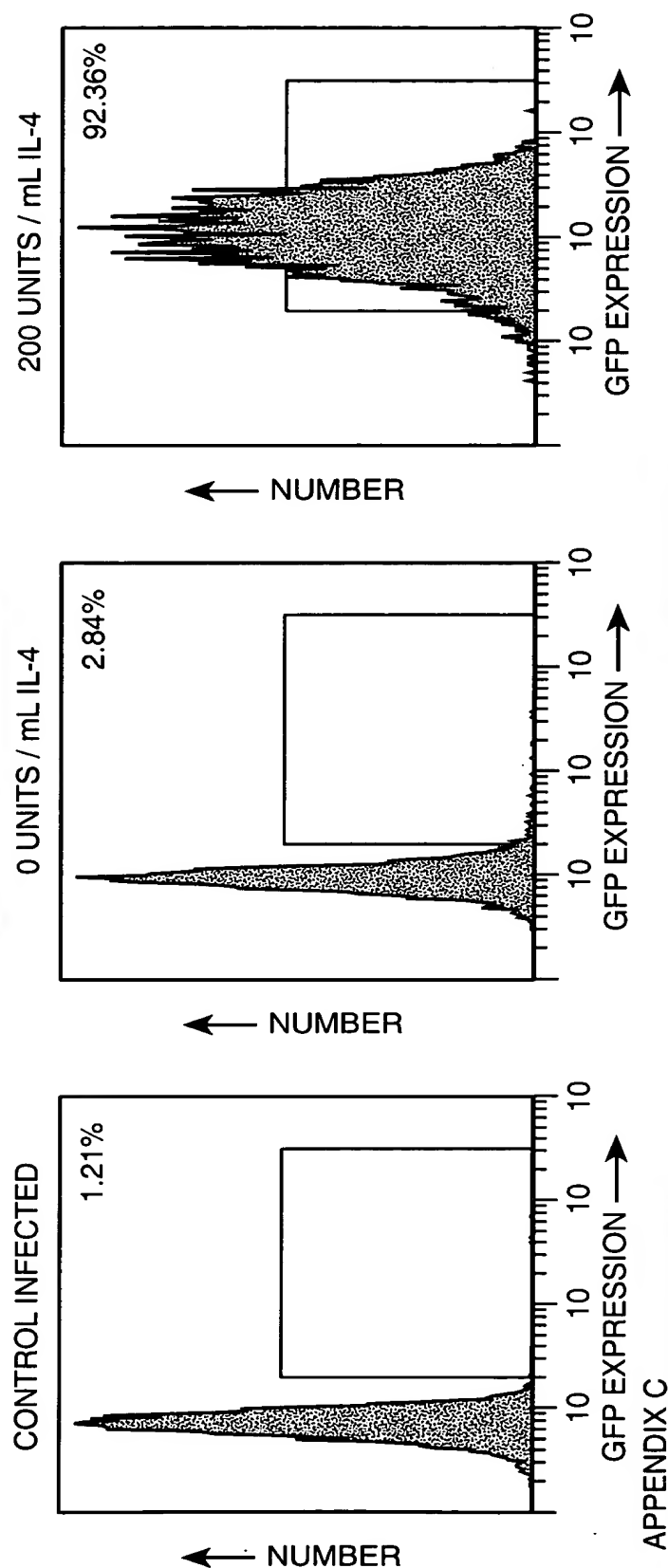
+

IL-4 INDUCIBLE ϵ PROMOTER REPORTER CELL LINE

REPORTER CONSTRUCT



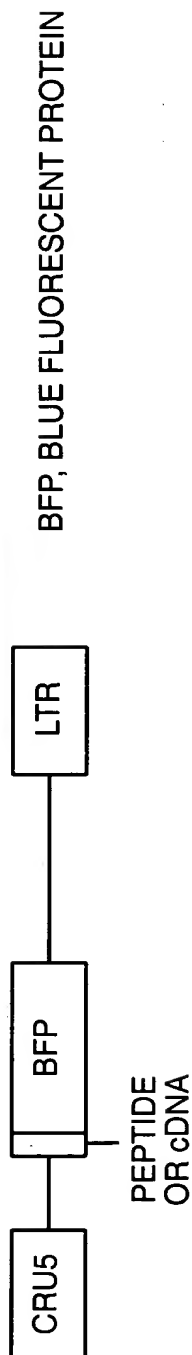
IL-4 INDUCED REPORTER



+

REPORTER LINE INFECTED WITH BFP CONSTRUCT

LIBRARY CONSTRUCT



FACS PROFILE OF CELLS WITH BOTH REPORTER AND PEPTIDE LIBRARY

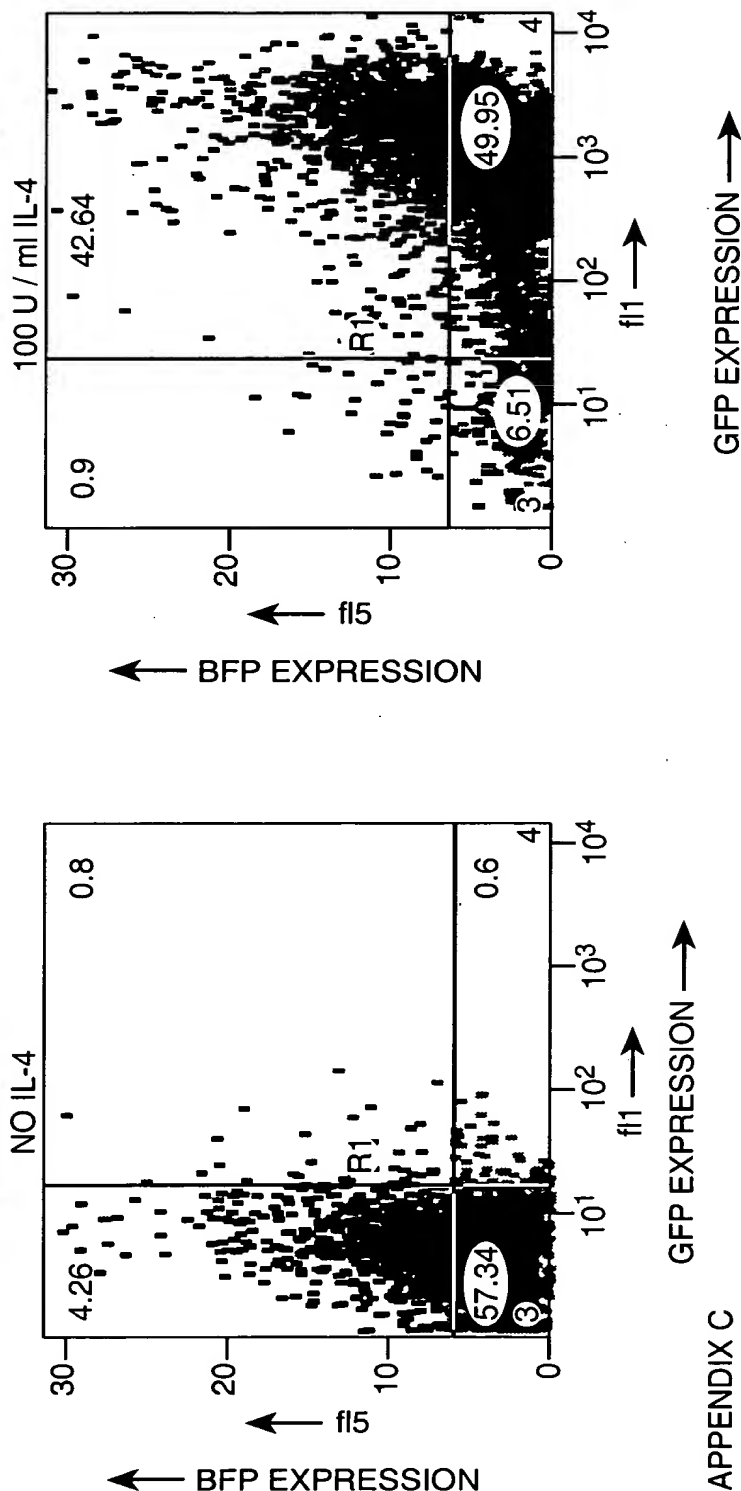
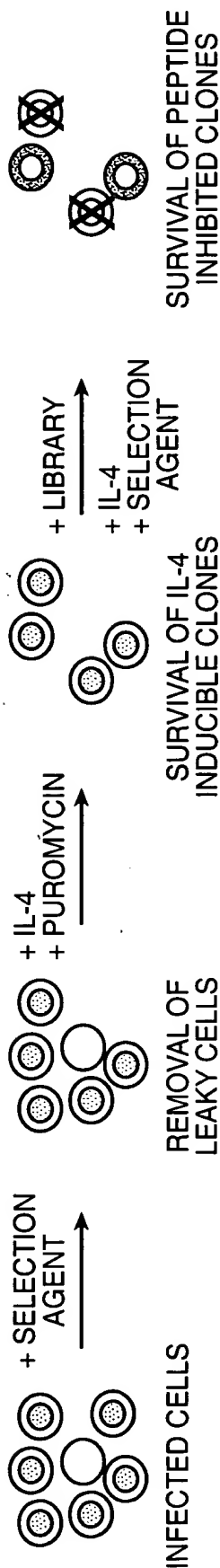
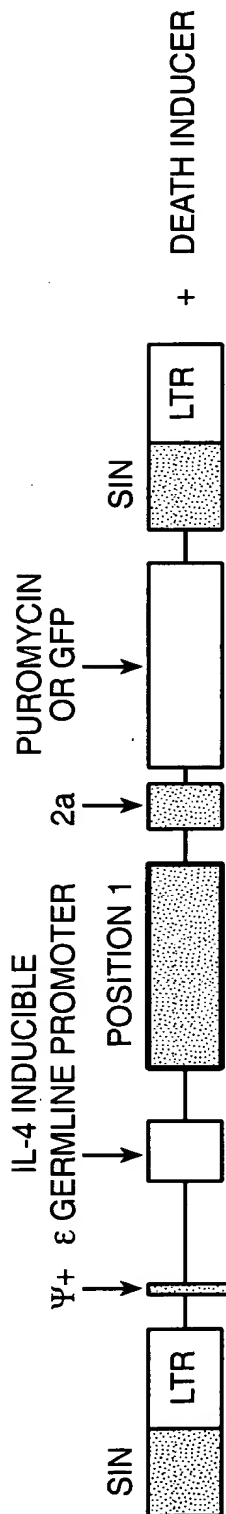


FIG. 9B

SCREEN FOR PEPTIDE INHIBITORS OF THE GERMLINE ϵ PROMOTER



SURVIVAL CONSTRUCT



POSITION 1

FAS CHIMERIC RECEPTOR*

*(MOUSE FASK EXTERNAL / MOUSE CD8 EXTERNAL + HUMAN TRANSMEMBRANE AND CYTOPLASMIC DOMAINS)

SIN, SELF-INACTIVATING LTR

LTR, LONG TERMINAL REPEAT

HSV-TK

P450 2B1

p21 PEPTIDE

SELECTION AGENT

α FAS

GANCICLOVIR

CYCLOPHOSPHAMIDE

NONE (SELF SELECTION)

ALL COMPONENTS ARE CASSETTED FOR FLEXIBILITY

APPENDIX D

FIG..10

13/28

1-845 CMV promoter/R/U5 5' LTR
 1322 GAG ATG-ATC mutation
 850-2100 extended Ψ region
 2146-2173 two Bstx1 peptide cloning sites
 2205-2723 ECMV IRES (cloned as EcoR1/MscI fragment from
 pCITE-4a [Novagen])
 2746-3465 GFP coding region
 3522-4115 3' LTR
 4122-6210 pGEM backbone (pUC origin, ampR)

ATCACGAGGCCCTTTTCGTCTTCAAGAACAGCTTTGCTCTTAGGAGTTTCCTAATACATCC
 CAAACTCAAATATATAAAGCATTGACTTGTCTATGCCCTAGTTATTAATAGTAATCAA
 TTACGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTTACGGTAA
 ATGGCCCGCCTGGCTGACCGCCCAACGACCCCCGCCCATTTGACGTCAATAATGACGTATG
 TTCCCATAGTAACGCCAATAGGGACTTTCCATTGACGTCAATGGGTGGAGTATTTACGGT
 AAAGTGGCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTACGCCCCCTATTGACG
 TCAATGACGGTAAATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTATGGGACTTTC
 CTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCGGTTTTGGC
 AGTACATCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCA
 TTGACGTCAATGGGAGTTTGTGTTTGGCACCAAAATCAACGGGACTTTCCAAAATGTCGTA
 ACAACTCCGCCCCATTGACGCAAATGGGCGGTAGGCATGTACGGTGGGAGGTCTATATAA
 GCAGAGCTCAATAAAAGAGCCCAACCCCTCACTCGGGGCGCCAGTCCTCCGATTGACT
 GAGTCGCCCCGGGTACCCGTGTATCCAATAAACCCCTCTTGACAGTTGCATCCGACTTGTGGT
 CTCGCTGTTCTTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGTCAGCGGGGGTCTTT
 CATTTGGGGGCTCGTCCGGGATCGGGAGACCCCTGCCCAGGGACCACCGACCCACCACCG
 GGAGGTAAAGCTGGCCAGCAACTTATCTGTGTCTGTCCGATTGTCTAGTGTCTATGACTGA
 TTTTATGCGCCTGCGTCCGGTACTAGTTAGCTAACTAGCTCTGTATCTGGCGGACCCGTGG
 TGGAAGTACGAGTTTCGGAACACCCGGCCGCAACCCTGGGAGACGTCCAGGGACTTCGG
 GGGCCGTTTTTGTGGCCCGACCTGAGTCCAAAAATCCCGATCGTTTTGGACTCTTTGGTG
 CACCCCCCTTAGAGGAGGGATATGTGGTTCTGGTAGGAGACGAGAACCCTAAAACAGTTCC
 CGCCTCCGTCTGAATTTTTTGCTTTTCGGTTTGGGACCGAAGCCGCGCCGCGCTCTTGTCT
 GCTGCAGCATCGTTCTGTGTTGTCTCTGTCTGACTGTGTTTCTGTATTTGTCTGAAAATA
 TCGGCCCCGGGCCAGACTGTTACCACTCCCTTAAGTTTGACCTTAGGTCACTGGAAAGATG
 TCGAGCGGATCGCTCACAACCAAGTCGGTAGATGTCAAGAAGAGACGTTGGGTACCTTCT
 GCTCTGCAGAATGGCCAACCTTTAACGTCGGATGGCCGCGAGACGGCACCTTTAACCGAG
 ACCTCATCACCCAGGTAAAGATCAAGGTCTTTTTCACCTGGCCCCGCATGGACACCCAGACC
 AGGTCCCCTACATCGTGACCTGGGAAGCCTTGGCTTTTGACCCCCCTCCCTGGGTCAAGC
 CCTTTGTACACCCTAAGCCTCCGCTCCTCTTCCCTCCATCCGCCCCGTCTCTCCCCCTTG
 AACCTCCTCGTTCGACCCCCGCTCGATCCTCCCTTTATCCAGCCCTCACTCCTTCTCTAG
 GCGCCCCCATATGGCCATATGAGATCTTATATGGGGCACCCCCGCCCCCTTGTAAGTCTCC
 CTGACCCCTGACATGACAAGAGTTACTAACAGCCCTCTCTCCAAGCTCACTTACAGGCTC
 TCTACTTAGTCCAGCACGAAGTCTGGAGACCTCTGGCGGCAGCCTACCAAGAACAACTGG
 ACCGACCGGTGGTACCTCACCTTACCGAGTCGGCGACACAGTGTGGGTCCGCCGACACC
 AGACTAAGAACCTAGAACCTCGCTGGAAAGGACCTTACACAGTCCTGCTGACCACCCCCA
 CCGCCCTCAAAGTAGACGGCATCGCGCTTGGATACACGCCGCCACGTGAAGGCTGCCGA
 CCCCAGGGGGTGGACCATCCTCTAGACTGCCGGATCTCGAGGGATCCACCACCATGGACCC
 CCATTAAATTGGAATTCCTGCAGCCCGGGGGGATCCACTAGTTCTAGAGCGAATTAATTCC

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GGTTATTTTCCACCATATTGCCGTCTTTTGGCAATGTGAGGGCCCGGAAACCTGGCCCTG
TCTTCTTGACGAGCATTCTAGGGGTCTTTCCCTCTCGCCAAAGGAATGCAAGGTCTGT
TGAATGTCGTGAAGGAAGCAGTTCCTCTGGAAGCTTCTTGAAGACAAACAACGTCTGTAG
CGACCCTTTGCAGGCAGCGGAACCCCCACCTGGCGACAGGTGCCCTCTGCGGCCAAAAGC
CACGTGTATAAGATACACCTGCAAAGGCGGCACAACCCCACTGCCACGTTGTGAGTTGGA
TAGTTGTGGAAGAGTCAAATGGCTCTCCTCAAGCGTATTCAACAAGGGGCTGAAGGATG
CCCAGAAGGTACCCCATTTGTATGGGATCTGATCTGGGGCCTCGGTGCACATGCTTTACAT
GTGTTTAGTCGAGGTTAAAAAACGTCTAGGCCCCCGAACCACGGGGACGTGGTTTTCTCT
TTGAAAAACACGATGATAATATGGGGGATCCACCGGTGCGCCACCATGGTGAGCAAGGGCG
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ACAAGTTCAGCGTGTCCGGCGAGGGCGAGGGCGATGCCACCTACGGCAAGCTGACCCTGA
AGTTCATCTGCACCACCGGCAAGCTGCCCGTGCCCTGGCCACCCTCGTGACCACCCTGA
CCTACGGCGTGACGTGCTTCAGCCGCTACCCCGACCACATGAAGCAGCACGACTTCTTCA
AGTCCGCCATGCCCGAAGGCTACGTCCAGGAGCGCACCATCTTCTTCAAGGACGACGGCA
ACTACAAGACCCGCGCCGAGGTGAAGTTCGAGGGCGACACCCTGGTGAACCGCATCGAGC
TGAAGGGCATCGACTTCAAGGAGGACGGCAACATCCTGGGGCACAAGCTGGAGTACAAC
ACAACAGCCACAACGTCTATATCATGGCCGACAAGCAGAAGAACGGCATCAAGGTGAAC
TCAAGATCCGCCACAACATCGAGGACGGCAGCGTGCAGCTCGCCGACCACTACCAGCAGA
ACACCCCATCGGCGACGGCCCCGTGCTGCTGCCCGACAACCACTACCTGAGCACCAGT
CCGCCCTGAGCAAAGACCCCAACGAGAAGCGCGATCACATGGTCTGCTGGAGTTCTGTGA
CCGCCCGCCGGGATCACTCTCGGCATGGACGAGCTGTACAAGTAAAGCGGCCGCTCGACGA
TAAATAAAAGATTTTATTTAGTCTCCAGAAAAAGGGGGGAATGAAAGACCCACCTGTA
GGTTTGGCAAGCTAGCTTAAGTAACGCCATTTTGCAAGGCATGGAAAAATACATAACTGA
GAATAGAGAAGTTCAGATCAAGGTCAGGAACAGATGGAACAGCTGAATATGGGCCAAACA
GGATATCTGTGGTAAGCAGTTCTTGCCCCGGCTCAGGGCCAAGAACAGATGGAACAGCTG
AATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTCTTGCCCCGGCTCAGGGCCAAGAA
CAGATGGTCCCCAGATGCGGTCCAGCCCTCAGCAGTTTCTAGAGAACCATCAGATGTTTC
CAGGGTGCCCCAAGGACCTGAAATGACCCTGTGCCTTATTTGAACTAACCAATCAGTTCG
CTTCTCGCTTCTGTTCGCGCGCTTCTGCTCCCCGAGCTCAATAAAAGAGCCACAACCCC
TCACTCGGGGCGCCAGTCTCCGATTGACTGAGTCGCCCGGGTACCCGTGTATCCAATAA
ACCCTCTTGCAAGTTGCATCCGACTTGTGGTCTCGCTGTTCTTGGGAGGGTCTCCTCTGA
GTGATTGACTACCCGTCAGCGGGGGTCTTTCATTTCCGACTTGTGGTCTCGCTGCCTTGG
GAGGGTCTCCTCTGAGTGATTGACTACCCGTCAGCGGGGGTCTTCACATGCAGCATGTAT
CAAAATTAATTTGGTTTTTTTTCTTAAGTATTTACATTAATGGCCATAGTTGCATTAAT
GAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGCGCTCTTCCGCTTCTCTGCT
CACTGACTCGCTGCGCTCGGTGCTTCGGCTGCGGCGAGCGGTATCAGCTCACTCAAAGGC
GGTAATACGGTTATCCACAGAATCAGGGGATAACGCAGGAAAGAACATGTGAGCAAAGG
CCAGCAAAGGCCAGGAACCGTAAAAAGGCCGCGTTGCTGGCGTTTTTCCATAGGCTCCG
CCCCCTGACGAGCATCACAAAAATCGACGCTCAAGTCAGAGGTGGCGAAACCCGACAGG
ACTATAAAGATACCAGGCGTTTCCCCCTGGAAGCTCCCTCGTGCGCTCTCCTGTTCCGAC
CCTGCCGCTTACCGGATACCTGTCCGCTTTCTCCCTTCGGGAAGCGTGGCGCTTTCTCA
TAGCTCACGCTGTAGGTATCTCAGTTCGGTGTAGGTGCTTCGCTCCAAGCTGGGCTGTGT
GCACGAACCCCCGTTTACGCCGACCGCTGCGCCTTATCCGGTAACTATCGTCTTGAGTC
CAACCCGGTAAGACACGACTTATCGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAG
AGCGAGGTATGTAGGCGGTGCTACAGAGTTCTTGAAGTGGTGGCCTAACTACGGCTACAC

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FIG. 11A-2

TAGAAGGACAGTATTTGGTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGGAAAAAGAGT
TGGTAGCTCTTGATCCGGCAAACAAACCACCGCTGGTAGCGGTGGTTTTTTTTGTTTGCAA
GCAGCAGATTACGCGCAGAAAAAAGGATCTCAAGAAGATCCTTTGATCTTTTCTACGGG
GTCTGACGCTCAGTGGAACGAAACTCACGTTAAGGGATTTTGGTTCATGAGATTATCAAA
AAGGATCTTCACCTAGATCCTTTTTAAATTAAAAATGAAGTTTGCGCAAATCAATCTAAAG
TATATATGAGTAAACTTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGCACCTATCTC
AGCGATCTGTCTATTTTCGTTTCATCCATAGTTGCCTGACTCCCCGTCGTGTAGATAACTAC
GATACGGGAGGGCTTACCATCTGGCCCCAGTGCTGCAATGATACCGCGAGACCCACGCTC
ACCGGCTCCAGATTTATCAGCAATAAACCAGCCAGCCGGAAGGGCCGAGCGCAGAAGTGG
TCCTGCAACTTTATCCGCCTCCATCCAGTCTATTAATTGTTGCCGGGAAGCTAGAGTAAG
TAGTTCGCCAGTTAATAGTTTGCGCAACGTTGTTGCCATTGCTACAGGCATCGTGGTGTG
ACGCTCGTCGTTTGGTATGGCTTCATTTCAGCTCCGGTTCCCAACGATCAAGGCGAGTTAC
ATGATCCCCCATGTTGTGCAAAAAAGCGGTTAGCTCCTTCGGTCTCCTCGATCGTTGTGAG
AAGTAAGTTGGCCGCAGTGTTATCACTCATGGTTATGGCAGCACTGCATAATTCTCTTAC
TGTCATGCCATCCGTAAGATGCTTTTCTGTGACTGGTGAGTACTCAACCAAGTCATTCTG
AGAATAGTGTATGCGGCGACCGAGTTGCTCTTGCCCGGCGTCAACACGGGATAATACCGC
GCCACATAGCAGAACTTTAAAGTGCTCATCATTGAAAACGTTCTTCGGGGCGAAAAC
CTCAAGGATCTTACCGCTGTTGAGATCCAGTTCGATGTAACCCACTCGTGCACCCAACTG
ATCTTCAGCATCTTTTACTTTCACCAGCGTTTCTGGGTGAGCAAAAACAGGAAGGCAAAA
TGCCGCAAAAAAGGGAATAAGGGCGACACGGAAATGTTGAATACTCATACTCTTCCTTTT
TCAATATTATTGAAGCATTTATCAGGGTTATTGTCTCATGAGCGGATACATATTTGAATG
TATTTAGAAAAATAAACAAATAGGGGTTCCGCGCACATTC

FIG._11A-3

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16 / 28

1-845 CMVpromoter/R/U5 5' LTR
 1322 GAG ATG-ATC mutation
 850-2100 extend d ψ region
 2151-2865 GFP coding region
 2866-2894 GGGSGGG linker
 2895-2952 FMDV 2a cleavage sequence
 2953-3004 Bstx1/Bstx1/HinD3/Hpa1/Sal1/Not1 polylinker
 3052-3645 3' LTR
 3652-5715 pGEM backbone (pUC origin, ampR)

ATCACGAGGCCCTTTCGTCTTCAAGAACAGCTTTGCTCTTAGGAGTTTCCTAATACATC
 CCAAACCTCAAATATATAAAGCATTGTGACTTGTTCTATGCCCTAGTTATTAATAGTAATC
 AATTACGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTTACGG
 TAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCCGCCCATTGACGTCAATAATGACG
 TATGTTCCCATAGTAACGCCAATAGGGACTTTCATTGACGTCAATGGGTGGAGTATTT
 ACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTACGCCCCCTA
 TTGACGTCAATGACGGTAAATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTATGG
 GACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
 GTTTTGGCAGTACATCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCGAAGTC
 TCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAAAATCAACGGGACTTTCCA
 AAATGTCGTAACAACCTCCGCCCCATTGACGCAAAATGGGCGGTAGGCATGTACGGTGGGA
 GGTCTATATAAGCAGAGCTCAATAAAAGAGCCCAACCCCTCACTCGGGGCGCCAGTC
 CTCCGATTGACTGAGTCGCCCCGGGTACCCGTGTATCCAATAAACCCCTCTTGCAAGTTGCA
 TCCGACTTGTGGTCTCGCTGTTCTTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGT
 CAGCGGGGGTCTTTTCATTTGGGGGGCTCGTCCGGGATCGGGAGACCCCTGCCCAGGGACC
 ACCGACCCACCACCGGGAGGTAAGCTGGCCAGCAACTTATCTGTGTCTGTCCGATTGTC
 TAGTGTCTATGACTGATTTTATGCGCCTGCGTCGGTACTAGTTAGCTAACTAGCTCTGT
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 ACGTCCCAGGGACTTCGGGGGGCCGTTTTTGTGGCCCGACCTGAGTCCAAAAATCCCGAT
 CGTTTTGGACTCTTTGGTGCACCCCCCTTAGAGGAGGGATATGTGGTTCTGGTAGGAGA
 CGAGAACCTAAACAGTTCCCGCCTCCGTCTGAATTTTGTCTTTCGGTTTGGGACCGAA
 GCCGCGCCGCGCGTCTTGTCTGCTGCAGCATCGTTCTGTGTTGTCTCTGTCTGACTGTG
 TTTCTGTATTTGTCTGAAAATATCGGCCCGGGCCAGACTGTTACCACTCCCTTAAGTTT
 GACCTTAGGTCACTGGAAAGATGTCGAGCGGATCGCTCACAACCAGTCGGTAGATGTCA
 AGAAGAGACGTTGGGTACCTTCTGCTCTGCAGAATGGCCAACCTTTAACGTCGGATGG
 CCGCGAGACGGCACCTTTAACCGAGACCTCATCACCCAGGTAAAGATCAAGGTCTTTTC
 ACCTGGCCCGCATGGACACCCAGACCAGGTCCCTACATCGTGACCTGGGAAGCCTTGG
 CTTTTGACCCCCCTCCCTGGGTCAAGCCCTTTGTACACCCTAAGCCTCCGCCTCCTCTT
 CCTCCATCCGCCCCGTCTCTCCCCCTTGAACCTCCTCGTTCGACCCCGCCTCGATCCTC
 CCTTTATCCAGCCCTCACTCCTTCTCTAGGCGCCCCCATATGGCCATATGAGATCTTAT
 ATGGGGCACCCCCGCCCTTGTAACCTTCCCTGACCCTGACATGACAAGAGTTACTAAC
 AGCCCTCTCTCCAAGCTCACTTACAGGCTCTCTACTTAGTCCAGCACGAAGTCTGGAG
 ACCTCTGGCGGCAGCCTACCAAGAACAACCTGGACCGACCGGTGGTACCTCACCCTTACC
 GAGTCGGCGACACAGTGTGGGTCCGCCGACACCAGACTAAGAACCTAGAACCTCGCTGG
 AAAGGACCTTACACAGTCTTGCTGACCACCCCCACCGCCCTCAAAGTAGACGGCATCGC
 AGCTTGGATACACGCCGCCACGTGAAGGCTGCCGACCCCGGGGGTGGACCATCCTCTA
 GACTGCCGGATCTCGAGGGATCCACCATGGTGAGCAAGGGCGAGGAGCTGTTACCGGG

FIG. 11B-1

17 / 28

GTGGTGCCCATCCTGGTCGAGCTGGACGGCGACGTAAACGGCCACAAGTTCAGCGTGTC
 CGGCGAGGGCGAGGGCGATGCCACCTACGGCAAGCTGACCCTGAAGTTCATCTGCACCA
 CCGGCAAGCTGCCCGTGCCCTGGCCACCCCTCGTGACCACCCTGACCTACGGCGTGTCAG
 TGCTTCAGCCGCTACCCCGACCACATGAAGCAGCAGACTTCTTCAAGTCCGCCATGCC
 CGAAGGCTACGTCCAGGAGCGCACCATCTTCTTCAAGGACGACGGCAACTACAAGACCC
 GCGCCGAGGTGAAGTTCGAGGGCGACACCCTGGTGAACCGCATCGAGCTGAAGGGCATC
 GACTTCAAGGAGGACGGCAACATCCTGGGGCACAAGCTGGAGTACAAC TACAACAGCCA
 CAACGTCTATATCATGGCCGACAAGCAGAAGAACGGCATCAAGGTGAAC T TCAAGATCC
 GCCACAACATCGAGGACGGCAGCGTGCAGCTCGCCGACCCTACCAGCAGAACACCCCC
 ATCGGCGACGGCCCCGTGCTGCTGCCCCGACAACCACTACCTGAGCACCCAGTCCGCCCT
 GAGCAAAGACCCCAACGAGAAGCGCGATCACATGGTCTTGCTGGAGTTCGTGACCGCCG
 CCGGGATCACTCTCGGCATGGACGAGCTGTACAAGGAATTCGGAGGTGGCAGCGGTGGC
 GGTCAGCTGTTGAATTTTGACCTTCTTAAACTTGCGGGAGACGTCGAGTCCAACCCTGG
 GCCCACCACCACCATGGAAGCTTCCATTAAATTGGTTAACGTCGACGCGGCCGCTCGAC
 GATAAAATAAAAGATTTTTATTAGTCTCCAGAAAAAGGGGGGAATGAAAGACCCACCT
 GTAGGTTTGGCAAGCTAGCTTAAGTAACGCCATTTTGCAAGGCATGGAAAAATACATAA
 CTGAGAATAGAGAAGTTCAGATCAAGGTCAGGAACAGATGGAACAGCTGAATATGGGCC
 AAACAGGATATCTGTGGTAAGCAGTTCCTGCCCCGGCTCAGGGCCAAAGAACAGATGGAA
 CAGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTCCTGCCCCGGCTCAGGG
 CCAAGAACAGATGGTCCCCAGATGCGGTCCAGCCCTCAGCAGTTTCTAGAGAACCATCA
 GATGTTTCCAGGGTGCCCCAAGGACCTGAAATGACCCTGTGCCTTATTTGAACTAACCA
 ATCAGTTTCGCTTCTCGCTTCTGTTTCGCGCGCTTCTGCTCCCCGAGCTCAATAAAAGAGC
 CCACAACCCCTCACTCGGGGCGCCAGTCCTCCGATTGACTGAGTCGCCCCGGGTACCCGT
 GTATCCAATAAACCTCTTGCAAGTTGCATCCGACTTGTGGTCTCGCTGTTTCTTGGGAG
 GGTCTCCTCTGAGTGATTGACTACCCGTCAGCGGGGGTCTTTTCAATTTCCGACTTGTGGT
 CTCGCTGCCTTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGTCAGCGGGGGTCTTCA
 CATGCAGCATGTATCAAAATTAATTTGGTTTTTTTTTCTTAAGTATTTACATTAAATGGC
 CATAGTTGCATTAAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGCGCT
 CTTCCGCTTCTCGCTCACTGACTCGCTGCGCTCGGTGCTTCGGCTGCGGCGAGCGGTA
 TCAGCTCACTCAAAGGCGGTAATACGGTTATCCACAGAATCAGGGGATAACGCAGGAAA
 GAACATGTGAGCAAAAGGCCAGCAAAAGGCCAGGAACCGTAAAAAGGCCGCGTTGCTGG
 CGTTTTTCCATAGGCTCCGCCCCCTGACGAGCATCACAAAATCGACGCTCAAGTCAG
 AGGTGGCGAAACCCGACAGGACTATAAGATAACCAGGCGTTTCCCCCTGGAAGCTCCCT
 CGTGCGCTCTCCTGTTCCGACCCTGCCGCTTACCGGATACCTGTCCGCCTTTCTCCCTT
 CGGGAAGCGTGCGCTTTCTCATAGCTCACGCTGTAGGTATCTCAGTTCCGGTGTAGGTC
 GTTCGCTCCAAGCTGGGCTGTGTGCACGAACCCCCCGTTCAGCCCGACCGCTGCGCCTT
 ATCCGGTAACTATCGTCTTGAGTCCAACCCGGTAAGACACGACTTATCGCCACTGGCAG
 CAGCCACTGGTAACAGGATTAGCAGAGCGAGGTATGTAGGCGGTGCTACAGAGTTCTTG
 AAGTGGTGGCCTAACTACGGCTACACTAGAAGGACAGTATTTGGTATCTGCGCTCTGCT
 GAAGCCAGTTACCTTCGGA AAAAGAGTTGGTAGCTCTTGATCCGGCAAACAAACCACCG
 CTGGTAGCGGTGGTTTTTTTTTGTGTTGCAAGCAGCAGATTACGCGCAGAAAAAAGGATCT
 CAAGAAGATCCTTTGATCTTTTCTACGGGGTCTGACGCTCAGTGGAACGAAAAC TCAGG
 TTAAGGGATTTTGGTCATGAGATTATCAAAAAGGATCTTCACCTAGATCCTTTTAAATT
 AAAAATGAAGTTTGCGCAAATCAATCTAAAGTATATATGAGTAAACTTGGTCTGACAGT
 TACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTGTCTATTTTCGTTTCATCCAT
 AGTTGCCTGACTCCCCGTCGTGTAGATAACTACGATACGGGAGGGCTTACCATCTGGCC
 CCAGTGCTGCAATGATACCGCGAGACCCACGCTCACCGGCTCCAGATTTATCAGCAATA

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FIG. 11B-2

AACCAGCCAGCCGGAAGGGCCGAGCGCAGAAGTGGTCCTGCAACTTTATCCGCCTCCAT
CCAGTCTATTAATTGTTGCCGGAAGCTAGAGTAAGTAGTTCGCCAGTTAATAGTTTGC
GCAACGTTGTTGCCATTGCTACAGGCATCGTGGTGTACGCTCGTCGTTTGGTATGGCT
TCATTCAGCTCCGGTCCCAACGATCAAGGCGAGTTACATGATCCCCATGTTGTGCAA
AAAAGCGGTTAGCTCCTTCGGTCCTCCGATCGTTGTCAGAAAGTAAGTTGGCCGCAGTGT
TATCACTCATGGTTATGGCAGCACTGCATAATTCTCTTACTGTCATGCCATCCGTAAGA
TGCTTTTCTGTGACTGGTGAGTACTCAACCAAGTCATTCTGAGAATAGTGTATGCGGCG
ACCGAGTTGCTCTTGCCCGGCGTCAACACGGGATAATACCGCGCCACATAGCAGAACTT
TAAAAGTGCTCATCATTGGAAAACGTTCTTCGGGGCGAAAACCTCTCAAGGATCTTACCG
CTGTTGAGATCCAGTTCGATGTAACCCACTCGTGCACCCAACTGATCTTCAGCATCTTT
TACTTTCACCAGCGTTTCTGGGTGAGCAAAAACAGGAAGGCAAAATGCCGCAAAAAGG
GAATAAGGGCGACACGGAAATGTTGAATACTCATACTCTTCCTTTTCAATATTATTGA
AGCATTTATCAGGGTTATTGTCTCATGACATTAACCTATAAAAATAGGCGT

FIG._11B-3

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1-845 CMVpormoter/R/U5 5' LTR
 1322 GAG ATG-ATC mutation
 850-2100 extended ψ region
 2146-2173 two Bstx1 peptide cloning sites
 2173-2214 Eor1/Apa1/Hpa1/Not1 polylinker
 2262-2855 3' LTR
 2855-4901 pGEM backbone (pUC origin, ampR)

ATCACGAGGCCCTTTCGTCTTCAAGAACAGCTTTGCTCTTAGGAGTTTCCTAATACATC
 CCAAACCTCAAATATATAAAGCATTGACTTGTTCTATGCCCTAGTTATTAATAGTAATC
 AATTACGGGGTCATTAGTTCATAGCCATATATGGAGTTCGCGGTTACATAACTTACGGT
 AAATGGCCCGCCTGGCTGACCGCCCAACGACCCCCGCCCATTTGACGTCAATAATGACGT
 ATGTTCCCATAGTAACGCCAATAGGGACTTTCCATTGACGTCAATGGGTGGAGTATTTA
 CGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTACGCCCCCTAT
 TGACGTCAATGACGGTAAATGGCCCGCCTGGCATTATGCCAGTACATGACCTTATGGG
 ACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCGG
 TTTTGGCAGTACATCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCGAAGTCT
 CCACCCCATTTGACGTCAATGGGAGTTTGTGTTTGGCACCAAAATCAACGGGACTTTCCAA
 AATGTCGTAACAACCTCCGCCCCATTGACGCAAAATGGGCGGTAGGCATGTACGGTGGGAG
 GTCTATATAAGCAGAGCTCAATAAAAGAGCCACAACCCCTCACTCGGGGCGCCAGTCC
 TCCGATTGACTGAGTCGCCCGGGTACCCGTGTATCCAATAAACCCCTCTTGAGTTCAT
 CCGACTTGTGGTCTCGCTGTTTCTTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGTC
 AGCGGGGGTCTTTCATTTGGGGGCTCGTCCGGGATCGGGAGACCCCTGCCAGGGACCA
 CCGACCCACCACCGGGAGGTAAGCTGGCCAGCAACTTATCTGTGTCTGTCCGATTGTCT
 AGTGTCTATGACTGATTTTATGCGCCTGCGTCCGGTACTAGTTAGCTAACTAGCTCTGTA
 TCTGGCGGACCCGTGGTGGAACTGACGAGTTCGGAACACCCGGCCGCAACCCCTGGGAGA
 CGTCCCAGGGACTTCGGGGGCGGTTTTTGTGGCCCGACCTGAGTCCAAAAATCCCGATC
 GTTTTGGACTCTTTGGTGCACCCCCCTTAGAGGAGGGATATGTGGTTCTGGTAGGAGAC
 GAGAACCTAAACAGTTCCCGCCTCCGTCTGAATTTTGGCTTTCGGTTCGGGACCGAAG
 CCGCGCCGCGCGTCTTGTCTGCTGCAGCATCGTTCTGTGTTGTCTCTGTCTGACTGTGT
 TTCTGTATTTGTCTGAAAATATCGGGCCCGGGCCAGACTGTTACCACTCCCTTAAGTTTG
 ACCTTAGGTCACCTGGAAAGATGTGAGCGGATCGCTCACAACCAGTCGGTAGATGTCAA
 GAAGAGACGTTGGGTACCTTCTGCTCTGCAGAAATGGCCAACCTTTAACGTCGGATGGC
 CGCGAGACGGCACCTTTAACCGAGACCTCATCACCCAGGTTAAGATCAAGGTCTTTTCA
 CCTGGCCCGCATGGACACCCAGACCAGGTCCCTTACATCGTGACCTGGGAAGCCTTGGC
 TTTTGACCCCCCTCCCTGGGTCAAGCCCTTTGTACACCCTAAGCCTCCGCCTCCTCTTC
 CTCCATCCGCCCCGTCTCTCCCCCTTGAACCTCCTCGTTTCGACCCCGCCTCGATCCTCC
 CTTTATCCAGCCCTCACTCCTTCTCTAGGCGCCCCCATATGGCCATATGAGATCCTTATA
 TGGGGCACCCCCGCCCCCTTGTAACCTTCCCTGACCCTGACATGACAAGAGTTACTAACA
 GCCCTCTCTCCAAGCTCACTTACAGGCTCTCTACTTAGTCCAGCACGAAGTCTGGAGA
 CCTCTGGCGGCAGCCTACCAAGAACAACTGGACCGACCGGTGGTACCTCACCTTACCG
 AGTCGGCGACACAGTGTGGGTCCGCCGACACCAGACTAAGAACCTAGAACCTCGCTGGA
 AAGGACCTTACACAGTCCTGCTGACCACCCCCACCGCCCTCAAAGTAGACGGCATCGCA
 GCTTGGATACACGCCGCCACGTGAAGGCTGCCGACCCCGGGGGTGGACCATCCTCTAG
 ACTGCCGGATCTCGAGGGATCCACCACCATGGACCCCATTAATTTGGAATTCGGGGCC
 CAAGCTTTGTAAACGTCGACGCGGCCGCGCTCGACGATAAAATAAAGATTTTATTTAG
 TCTCCAGAAAAAGGGGGGAATGAAAGACCCACCTGTAGGTTTGGCAAGCTAGCTTAAG
 TAACGCCATTTTGCAAGGCATGGAAAAATACATAACTGAGAATAGAGAAGTTCAGATCA

FIG. 11C-1

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AGGTCAGGAACAGATGGAACAGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGCAG
TTCCTGCCCCGGCTCAGGGCCAAGAACAGATGGAACAGCTGAATATGGGCCAAACAGGA
TATCTGTGGTAAGCAGTTCCTGCCCCGGCTCAGGGCCAAGAACAGATGGTCCCCAGATG
CGGTCCAGCCCTCAGCAGTTTCTAGAGAACCATCAGATGTTTCCAGGGTGCCCCAAGGA
CCTGAAATGACCCTGTGCCTTATTTGAACTAACCAATCAGTTCGCTTCTCGCTTCTGTT
CGCGCGCTTCTGCTCCCCGAGCTCAATAAAAGAGCCCACAACCCCTCACTCGGGGCGCC
AGTCTCCGATTGACTGAGTCGCCCCGGGTACCCGTGTATCCAATAAACCCCTCTTGCACT
TGCATCCGACTTGTGGTCTCGCTGTTCCCTTGGGAGGGTCTCCTCTGAGTGATTGACTAC
CCGTACGCGGGGGTCTTTCATTTCCGACTTGTGGTCTCGCTGCCTTGGGAGGGTCTCCT
CTGAGTGATTGACTACCCGTACGCGGGGGTCTTCACATGCAGCATGTATCAAAATTAAT
TTGGTTTTTTTTTCTTAAGTATTTACATTAAATGGCCATAGTTGCATTAATGAATCGGCC
AACGCGCGGGGAGAGGCGGTTTGCCTATTGGCGCTCTTCCGCTTCTCGCTCACTGACT
CGCTGCGCTCGGTGCTTCGGCTGCGGCGAGCGGTATCAGCTCACTCAAAGGCGGTAATA
CGGTTATCCACAGAATCAGGGGATAACGCAGGAAAGAACATGTGAGCAAAAGGCCAGCA
AAAGGCCAGGAACCGTAAAAAGGCCGCGTTGCTGGCGTTTTTCCATAGGCTCCGCCCCC
CTGACGAGCATCACAAAAATCGACGCTCAAGTCAGAGGTGGCGAAACCCGACAGGACTA
TAAAGATACCAGGCGTTTCCCCCTGGAAGCTCCCTCGTGCGCTCTCCTGTTCCGACCCT
GCCGCTTACCGGATACCTGTCCGCCTTTCTCCCTTCGGGAAGCGTGGCGCTTTCTCATA
GCTCACGCTGTAGGTATCTCAGTTCGGTGTAGGTGCTTCGCTCCAAGCTGGGCTGTGTG
CACGAACCCCCCGTTTCAGCCCGACCGCTGCGCCTTATCCGGTAACTATCGTCTTGAGTC
CAACCCGGTAAGACACGACTTATCGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCA
GAGCGAGGTATGTAGGCGGTGCTACAGAGTTCTTGAAGTGGTGGCCTAACTACGGCTAC
ACTAGAAGGACAGTATTTGGTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGGAAAAAG
AGTTGGTAGCTCTTGATCCGGCAAACAAACCACCGCTGGTAGCGGTGGTTTTTTTTGTTT
GCAAGCAGCAGATTACGCGCAGAAAAAAGGATCTCAAGAAGATCCTTTGATCTTTTCT
ACGGGGTCTGACGCTCAGTGGAAACGAAAACCTCACGTAAAGGGATTTTGGTCATGAGATT
ATCAAAAAGGATCTTCACCTAGATCCTTTTAAATTAAAAATGAAGTTTGCGCAAATCAA
TCTAAAGTATATATGAGTAAACTTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGCA
CCTATCTCAGCGATCTGTCTATTTTCGTTTCATCCATAGTTGCCTGACTCCCCGTCGTGTA
GATAACTACGATACGGGAGGGCTTACCATCTGGCCCCAGTGCTGCAATGATACCGCGAG
ACCCACGCTCACCGGCTCCAGATTTATCAGCAATAAACCCAGCCAGCCGGAAGGGCCGAG
CGCAGAAGTGGTCCTGCAACTTTATCCGCCTCCATCCAGTCTATTAATTGTTGCCGGGA
AGCTAGAGTAAGTAGTTCGCCAGTTAATAGTTTGGCGCAACGTTGTTGCCATTGCTACAG
GCATCGTGGTGTACGCTCGTCGTTTGGTATGGCTTCATTACAGCTCCGGTTCCCAACGA
TCAAGGCGAGTTACATGATCCCCCATGTTGTGCAAAAAAGCGGTTAGTCTCCTTCGGTCC
TCCGATCGTTGTCAGAAGTAAGTTGGCCGCGAGTGTTATCACTCATGGTTATGGCAGCAC
TGCATAATTCTCTTACTGTCTATGCCATCCGTAAGATGCTTTTCTGTGACTGGTGAGTAC
TCAACCAAGTCATTCTGAGAATAGTGATGCGGCGACCGAGTTGCTCTTGCCCGGCGTC
AACACGGGATAATACCGCGCCACATAGCAGAACTTTAAAAGTGCTCATCATTGGAAAAC
GTTCTTCGGGGCGAAAACCTCTCAAGGATCTTACCGCTGTTGAGATCCAGTTCGATGTAA
CCCCTCGTGCACCCAACTGATCTTCAGCATCTTTTACTTTTACCAGCGTTTCTGGGTG
AGCAAAAACAGGAAGGCAAAATGCCGCAAAAAGGGAATAAGGGCGACACGGAAATGTT
GAATACTCATACTCTTCTTTTTCAATATTATTGAAGCATTTATCAGGGTTATTGTCTC
ATGACATTAACCTATAAAAATAGGCGT

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FIG._11C-2

(1) C12ScFas Survival construct

C12ScFas: psilon-cFas(CD95)-Ires-Hygro-BGH PolyA put into C12s vector backwards so that no leaky transcription happens through the cmv promoter.

atcacgagggcccttcgtcttcaagaacagcgtttgctcttaggagtttccctaatacatccccaaactcaaaatatataaagc
atttgacttggttctatgccctagttattaataagtaataacattacggggtcattagttcatagcccatatataggagttccg
cgttacataaacttacggtaaatggccgcctggctgacggcccaacgaccccgccattgacgtcaataatgacgtatg
ttcccatagtaacgccaatagggaactttccattgacgtcaaatgggtgagttattacggtaaactgcccaattggcagta
catcaagtgtatcatatgccaaagtacgccccctattgacgtcaatgacggtaaatggccgcctggcattatgcccagta
catgaccttatgggaactttccctacttggcagttacatctacgtattagtcacgtattacccatgggtgatgctgtttggc
agtacatcaatgggcgtggatagcgggtttgactcacgggatttccaaagtctccaccccatgacgtcaatgggagtttg
tttggcaccaaaatcaacgggactttccaaaatgtcgtaaactccgccccattgacgcaaatggcggtaggcatgt
acggtgggaggtctatatataagcagagctcaataaaagagcccaaacccctcactcggggcgccagtcctccgattgact
gagtcgcccgggtacccgtgtatccaaataaacccctcttgcatcggacttggtctcgctgttccttgggaggg
tctcctctgagtgattgactacccgtcagcggggtctttcatttggggctcgctcgggatcgggagacccctgcccag
ggaccacgacccaccgggaggtaaagtggccagcaacttatctgtctgtcgtcgtcgttagtctatgactga
ttttatgcgctcgctcggtactagttagtaactagctctgtatctggcggaacccgtggtggaactgacgagttcggaa
cacccggccgcaacccctgggagacgtcccagggaactcggggcggtttttgtggcccgacccgtgagtccaaaaatccccga
tcgttttggactctttggtgcaaccccttagaggagggtatgtggtctctggtaggagacgagaacctaaacacagtctcc
cgctccgctgtaattttgcttctggtttgggacggaagccgcgcgctctgtctgctgctgacgacatcgttctgtgt
tgtctctgtcgtgactgtgttctgtatttctgtctgaaataatgggccccggccagactgttaccactcccttaagtttgac
cttaggtcacgtggaaagatgtcgagcggatcgctcacaaaccagtcggtagatgtcaagaagagacgttgggttaccttct
gctctgcagaaatggccaaacctttaacgtcggatggccgcgagacggcacctttaaccgagacccatcacccagggttaag
atcaagggtctttcacctggcccgcatggacacccagaccaggtccctacatcgtgacctgggaagccttggccttttga
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gagatcttatatggggcaccccccgcccttgtaaacttccctgacctgacatgacaaagagttactaaacagccccctctct
ccaagctcacttacaggctctctacttagtcagcacgaagtctggagacctctggcggcagcctaccagaacaaactgg
accgacgggtgtacctcaccccttaccgagtcggcgacacagtggttccgcccagaccagactaaagaacctagaacct
cgctggaaaggaccttacacagtcctgctgaccacccccacccctcaaaagtacgggcatcgagcttggtatcacgc
cgccacgtgaaggctgccgacccccggggtggaccatcctctagactcctcggtatcgagggtatcctccccagcatGCC

TGCTATTGCTTCCCAATCCTCCCCCTTGCTGTCTGCTGCCCCACCCCAAGATAGATGACACCTACTCAGACAA

TGGGATGCAATTTCCTCATTTTATTAGGAAAGGACAGTGGGAGTGGCACCTTCCAGGGTCAAGGAAGGCACGGGGGAGGG

GCAAACAACAGATGGCTGGCAACTAGAAGGCACAGTCGAGGCTTAGCTTGCCAAACCTACAGGTGGGGTCTTTTCATTCCC

FIG. 12A

CCCTTTTCTGGAGACTAAATAAAATCTTTTATTatcgatagatcccggctcggcacatctactctattccttgcctctcg
gacgagtgcctggggcgtcgggttccactatcggcgagtaactctacacagccatcgggtccagacggcgcgcttctgcgg
gcgatttgtgtacgcccgcagatcccggctccggatcggagattgctcgatcgacccctgcgccaaagctgcacatc
gaaattgcgctcaaccaagctctgatagagtgggtcaagaccaaagcggagcatatacgcgccggagccgcggcgatccctg
caagctccggatgcctccgctcgaagttagcgcgtctgctgctccatacaagccaaacacggcctccagaagaagatgttg
gcgacctcgtattgggaatccccgaacatcgccctcgctccagtcgaatgacgcgtgttatgcgggccattgtccgtcaggac
attgttggagccgaaatccgcgtgcacgaggtgcggacttcggggcagtcctcgcccaagcatcagctcatcgagag
cctgcgcgacggacgactgacgggtgctgctccatcacagtttgcagtgatacacatggggatcagcaatcgcgcatacg
aaatcacgccatgtagtattgaccgatctcctgcggtccgaatgggcccgaacccgctcgtctggttaagatcggccgc
agcatcgcatccatggcctccgcgacggcctgcgaacagcggcagttcgggttcaggcaggtccttgcaacgtgacac
cctgtgcagggcgagatgcaataggtcaggtcctgcgtacaaatccccaaatgcaagcactccggaaatcgggagcg
gccgatgcaagtgcgataaaacataacgatccttgtagaaacccatcggcgagctatttaccgcgagacatatccacg
ccctcctacatcgaagtgaagcacgagatcttcgccctccgagagctgcatcaggtcggagacgtgtcgaaacttt
cgatcagaaacttctcgacagacgtcgcgggtgagttcaggcttttcatggtattatcatcgtgttttcaaaggaaaac
cacgtccccgtggtcggggggtcctagacgttttttaacctcgactaaacacatgtaaacgcatgtgcacgagggccccag
atcagatccccatacaaatgggtaccttctgggcatccttcagcccttgttgaaatcgcttgaggagagccatttgactc
ttccacaactatccaaactcaaacgtggcactgggttgcgcgcttgcaggtgtatcttatcacgtggcttttgg
ccgcagaggcacctgtcgcaggtgggggttcgcgtgcctgcaaaagggtcgtacagacgtgtgttgccttcaagaagc
ttCCAGAGGAAC TGCTTCTTACGACATTCACAGACCTTGCAATCTTGGCGAGAGGGGAAAGACCCctagactaga
ccaagctttggatttcattctgaagtttgaattttctgagtcactagtaatgctccttgaggatgatatctgaattttc
tctgcaagagtaacaagattggcttttttgagatctttaatacaatggtcatacgtcttcttcttccatgaagttgatg
ccaattacgaagcagttgaactttctgttctgctgtgtcttgacattgtcatcttcttgatcctcatctattttggcttcat
tgacacatttcttccgaacaaagcctttaacttgacttagtgatgacccagcaatagtggtgatatatttactcaag
tcaacatcagataaaatttattgccaatggttccaggatttaagggtggagattcattgagaaaccttggttttcccttctgtg
cttctctgcatgtttctgtacttcttcttccaccccaacaaattagtggaatttgcaaaagaaagaaagaaagccacc
ccaaacccggttTCTGGGACTTTGTGTTCTCTGCAGTTTGTATTGCTGCTGCTGCTCAAGGGTTCCATGTTTCACAC
GAGGGCGAGGAACACAGTGTTTCACAGCCAGGAGAAATCGCAGTAGAAGTCTGGTTTGCACCTTGCTGCTTCTGGGT
CAGGGTGACAGTTTGTGTTTCCACTTCTTAAACCATGCTCTTTCATCGCAGAGTGTCATCTTCTGCAATTTATCAGCATAAATGGT
TCTTGTCATGTA CTCTCTCCCTTCTGTCATGGGGCACAGGTTGGTGTA CCCCCCATTCATTTTGCAGTCTCTCAACTTTT
TTTTTACCAGGTTGGCATGGTTGACAGCAAAATGGGCCCTCCTTGATATAATCCTTCTGAGCAGTTTTTATCAGTTTCATG
AACCCGCCCTCCTCAGCTTTAAACTCTCGGAGATGCTATTAGTACCTTGAGTATGAACCTTAACTGTGAGCCAGCAAGCA

CCAGAGGCAGGACAGCCAGATCCACACCATgGTGGCTTTACCAACAGTACCGGAATGCCAAGCTTGCGGCCGCTTAAGA
GCTGTAATTGAACCTGGGAGTGGACACCTGTGGAGAGAAAGGCAAAAGTGGATGTCAAGTAAAGACCAATAGGTGCCTATCAG
AAACGCAAGAGTCTTCTCTGTCTCGACAAGCCAGTTTCTATTGGTCTCCTTAAACCTGTCTTGTAAACCTTGATACTTAC
CTGCCCAGTGCCCTCACGACCAACTTctgcaggaaatccctggacagctcccagatgatcagtaaacctggtgttatttct
gtgccgggcagtgagcctgggtaggggagctctgcctcagtgctttcagctaaaaatggggtgggaacccccCaggagg
cccgccgcccctggaagtccctttctctctgtcttgggaagtcgattgagcaacacgagggtcaggtgaggtctcc
ttcaactaccgatgcacacccagtgctGggggagggttctctctctcagggcccaacCccaggggccccctgacctagggtccc
ggactctCactcttgacgcatgcgtggcttgggtgggtcccagtcagcaaaacttgggggtcccggttgcctgggaaaggaggag
ggtaactgggcatcgacgcctctgcttccacgaaaagccttgtgaagaaaaggatggggggcgttttgtgcaggagaaatgagg
cgcaactgaggtgaactggccctcggggGcgcgtgtcccagatgtgtgtgcaggggcctcctgatggccgagccctcgtcc
ctgtgaccccgcttgagagctggcaccctgagtggtggcctcacCTTGTACTCCTCCAGGTCACTGTCTCctcgacGCGGGCC

GCTCGAcgatAAAAATAAAGATTTTATTAGTCTCCAGAAAAAGGGGGGAATGAAAGACCCACCTGTAGTTTGGCAAG
ctagctTAAGTAACCCATTTTGCAAGGCATGGAAAAATACATAACTGAGAATAGAGAAAGTTCAGATCAAGGTCGGAACAG
ATGGAACAGGCAATAAAAGAGCCCAACCCCTCACTCGGGGCGCCAGTCTCCGATTGACTGAGTCGCCCGGGGTACCCG
TGTATCCAATAAAACCCCTTTGCAGTTGCATCCGACTTGTGGTCTCGCTGTTCTCTTGGGAGGGTCTCCTCTGAGTGATTGA
CTACCCGTCAGCGGGGTCTTTCAcatgcagCATGTATCAAAAATTAATTTGGTTTTTTTCTTAAGTATTACATTAAAT
GGCCATagtttcGTAATCATGGTCAATAGCTGTTTCTGTGTGAAATTGTTATCCGCTCACAAATCCACACAACATACGAG
CCGGAAGCATAAAGTGTAAGCCCTGGGGTGCCCTAATGAGTGAGCTAACTCACATTAATTGCCGTTGCCGCTCACTGCCCGCT
TTCCAGTCGGGAAACCTGTCTGTGCCAGCTGCATTAATGAATCGGCCAACCGCGGGGAGAGCGGTTTGCGTATTGGGCG
CTCTTCCGCTTCTCGCTCACTGACTCGCTGCGCTCGGTCGTTCTGGCTGCGGGGAGCGGTATCAGCTCACTCAAAAGGCGG
TAATACGGTTATCCACAGAAATCAGGGGATAACGCAGGAAAGAAACATGTGAGCAAAAGGCCAGCAAAAGGCCAGGAACCCGT
AAAAAGGCCGCGTGTGTCGGCTTTTCCATAGGCTCCGCCCCCCCTGACGAGCATCAAAAAATCGACGCTCAAGTCAGAG
GTGGCGAAACCCGACAGGACTATAAAGATACCAGGCGTTTCCCTCCCTGGAAAGCTCCCTCGTGGCTCTCTCTGTTCCGACCC

TGCCGCTTACCGGATACCTGTCCGCCCTTTCTCCCTTCGGGAAGCGTGGCGCTTTCTCATAGCTCACGCTGTAGGTATCTC
AGTTCGGGTAGGTTCGCTCCAAAGCTGGGCTGTGTGCACGAACCCCCCGTTTCAGCCCGACCGCTGCCCTTATCCGG
TAACTATCGTCTTGAGTCCAAACCCGGTAAGACACGACTTATCGGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAGAG
CGAGGTATGTAGCGGTGCTACAGAGTTCTTGAAGTGGTGCCCTAACTACGGCTACACTAGAAGGACAGTATTTGGTATC
TGGCTCTGCTGAAGCCAGTTACCTTCGGAAAGAGTTGGTAGCTCTTGATCCGGCAAAACAAACCCGCTGGTAGCGG
TGGTTTTTTTGTGCAAGCAGCAGATTACGGCAGAAAAAGGATCTCAAGAAGATCCTTTGATCTTTCTACGGGGT
CTGACGCTCAGTGAACGAAACTCACGTTAAGGATTTTGGTCATGAGATTATCAAAAAGGATCTTCACCTAGATCCCTT
TTAAATTAAAAATGAAGTTTGGCAAAATCAATCTAAAGTATATATGAGTAAACTTGGTCTGACAGTTACCAATGCTTAAT
CAGTGAGGCACCTATCTCAGCGATCTGTCTATTTTCGTTTCATCCATAGTTGCCCTGACTCCCCGTCGTGTAGATAACTACGA
TACGGGAGGGCTTACCATCTGGCCCCAGTGCTGCAATGATACCGCGAGACCCACGCTCACCGGCTCCAGATTATCAGCA
ATAAACCCAGCCCGGAAGGGCCGAGCGCAGAGTGGTCTTGCAACTTTATCCGCCCTCCATCCAGTCTATTAATTGTTG
CCGGGAAGCTAGATAAGTAGTTCGCCAGTTAATAGTTTGGCCAACGTTGTTGCCATTGCTACAGGCATCGTGGTGTCCAC
GCTCGTCGTTTGGTATGGCTTCATTACGCTCCGGTTCCCAACGATCAAGGCGAGTTACATGATCCCCCATGTTGTGCAAA
AAAGCGGTAGCTCCTTCGGTCCCGATCGTTGTCAGAAGTAAGTTGGCCGCGAGTGTATCACTCATGGTTATGGCAGC
ACTGCATAAATCTCTTACTGTATGCCATCCGTAAGATGCTTTTCTGTGACTGGTGagtactcaaccaagtcatctgtgag
aatagtgtatgcggcgaccgagttgctcttgcggcggtcaacacgggataataccgcgccacatagcagaactttaaa
gtgctcatcatggaaaaacgttctcggggcgaaaaactctcaaggatcttacgctgttgagatccagttcgtatgtaacc
cactcgtgcacccaactgatcttcagcatctttactttcaccagcgtttctgggtgagcaaaaaacaggagcaaaatg
ccgcaaaaaagggaataaggcgacacggaaaatgttgaatactcatctctcttttcaatatatttgaagcatttat
cagggttatgtctcatgacattaacctataaaaaataggcgt

FIG. 12D

CCCTTTTCTGGAGACTAAATAAAATCTTTTATTTatcgatagatcccgggtcggcatctactctattccttctgcccctcg
gacgagtgctggggcgtcgggttccactatcggcgagtaacttctacacagccatcgggtccagacggcgcgcttctgcccgg
gcatattgtgtacgcccagacagtcgggctccggatcggacgattgctgcgcatcgacccctgcgcccgaagctgcatcatc
gaaattgcccgtcaaccaagctctgatagagttggtcaagaccaaagcggagcatatacgcccggagcgcgcccgcgacatcctg
caagctccggatgcccctcggctcgaagttagcggctcgtctccatacaagccaaacacggcctccagaagaagatggtg
gcgacctgtaattgggaatcccgcgaacatcggctcggtaacagcgtggttatgaggccatgtccgtcaggac
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cctgcgcgacggacgcaactgacggtgctgctccatcacagtttgcagtgatacacatggggatcagcaaatcgcgcatacg
aaatacagcccatgtagtattgaccgattccttgcggtccgaatgggcccgaacccgctcgtctggttaagatcggccgc
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ccgcagagccactgtcgcaggtgggggttccgctgcctgcaaaagggtcgctacagacgttgttcttcaagaagc
ttCCAGAGGAAC TGCTTCTTCACGACATTCAACAGACCTTGCAATCTTTGGCGAGAGGGGAAAGACCCcttagactaga

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gtgcctgtggcttagcttctccactcccaggtataatcgactcaccagcagcaggttccagcgacagaaagcgggtc
aacggtgagggccatgtGGGCTTTACCAACAGTACCGGAATGCCAAGCTTGCGGCCGCTTAAGAGCTGTAATTGAACCTGG

GAGTGGACACCTGTGGAGAGAAAGGCAAGTGATGTCAGTAAGACCAATAGGTGCCTATCAGAAACGCAAGAGTCTTCT

CTGTCTCGACAAGCCCAGTTTCTATTGGTCTCTCTTAAACCTGTCTTGTAACCTTGATACTTACCTGCCAGTGCCCTCAGC

(2) Abhhh: Survival construct

2.) Ahhhh: epsilon-cFas' (CD8 or mLyf2)-Ires-Hygro-BGHpolyA also in C12s backwards

atcacgaggcccttctgcttcaagaacagcttctgctttaggagtttcttaatacatatcccaactccaaatatataaagc
atattgacttgcttatgccctagttattaatagtaatacaattacggggtcatagttcatagcccatatagggagtccg
cgttacataacttacggtaaatggcccgctgacctgacgccaacgaccccgcccattgacgtcaataatgacgtatg
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ggagtgcgccgggtacctgtatccaataaaacctcttgagttgcatcgacttgggtctcgctgttctcttgggaggg
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cgctggaaaggaccttacaagtcctgtgacacccccccctcaaatagtagcggcatcgcagcttggatacacgc
ggccacgtgaaggctgcgacccccgggggtggaccatcctctagactgcccggatctcgcagggtatcttccccagcatGCC

TGCTATTGCTTCCCAATCCCTCCCTTGCTGTCTGCCCAACCCCAAGATGACACCTACTCAGACAA

TGCGATGCAATTTCCTCATTTTATTAGGAAGGACAGTGGAGTGGCACCTTCCAGGTCAGGAAGCACGGGGGAGGG

GCAACAACAGATGGCTGGCAACTAGAGGCACAGTCGAGGtCTAGCTTGCCAAACCTACAGGTGGGTCTTTTCATTCCC

FIG. 13A

ACCAACTTctgcaggaaattcctggacagctcccagatgatcagtaaccgtggttggtattctgtgccgggcagtgagc
ctgggtaggggagctctgcctcagtgctttcagctaaaaatggggtgggaaccccCaggaggcccgccgcccctggaa
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GACTATAAGATACCAGGCGTTTCCCCCTGGAAGCTCCCTCGTGCGCTCTCCTGTTCCGACCCCTGCCGCTTACCGGATAC
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GCTACAGAGTTCTTGAAGTGGTGGCCTAAC TACGGCTACACTAGAAGGACAGTATTGGTATCTGCGCTCTGCTGAAGCC
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CGGTCCCTCCGATCGTTGTCAGAAAGTTGGCCGCGAGTGTATCACTCATGGTTATGGCAGCAGCTGCATAATCTCTTA
CTGTCA TGCCATCCGTAAGATGCTTTTCTGTGACTGGTGagtgactcaaccaagtcattctgagaatagtgatgcggcga
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agggcgacacgggaaatgtgaatactcatactcttccttttccaatattattgaagcatttatcagggttatgtctcat
gacattaacctataaaaaataggcgt

FIG.- 13D